REMARKS

In the response dated September 24, 2004, applicants erroneously changed the heading for Example 6, to Reference Example 6. The above amendments to the specification change Reference Example 6 back to Example 6. In addition, Reference Example 5 has been changed Comparative Example 7 and Example 7 has been amended to Example 8. These amendments were made because, as described below, these Examples describe fibers which do not satisfy the claimed conditions. Finally, claim 12 has been added to the application. This claim is supported on page 12, lines 10-12 of the specification and by Examples 1-4, 6 and 8.

Claims 1-4, 6 and 8 stand rejected under 35 USC 103(a) as being unpatentable over Endo. Claim 7 stands rejected under 35 USC 103(a) as being unpatentable over Endo in view of Buxbaum. Claims 9-11 stand rejected under 35 USC 103(a) as being unpatentable over Endo in view of Vogt. These rejections are respectfully traversed.

In independent claim 1, applicants claim a flame-retardant polyester fiber including a phosphorus compound copolymerized polyester comprising a phosphorous atom in a side chain and satisfying the following formulas (1)-(3):

$$\tan \delta_{max} \geq 0.1740 \qquad \text{(formula 1)}$$

$$T\alpha - 3.77 \times \ln(dtpf) \leq 137.0 \qquad \text{(formula 2)}$$

$$1.331 \leq SG - \frac{\sqrt{\Delta n}}{8.64} \leq 1.345 \qquad \text{(formula 3)}$$

wherein $\tan \delta_{max}$ is a maximum value of loss tangent in a dynamic viscoelasticity measurement, $T\alpha$ is a temperature at which loss tangent reaches the maximum, dtpf is single fiber fineness (dtex), SG is density (g/cm^3), Δn is birefringence and wherein the flame-retardant polyester fiber is produced by melt-spinning at a take-up speed of 1000 m/min - 4500 m/min, has a phosphorous content of 500-50,000 ppm and has a shrinkage in hot water (SHW) of not more than 10%.

The Examiner admits that the claimed take-up speed is not disclosed by Endo. However, the Examiner states that the take-up speed is a "result effective variable" and it would be obvious to use

the claimed take-up speed since finding an optimum value involves only routine skill in the art. The Examiner also admits that Endo fails to disclose a fiber having the characteristics described in formulas 1-3 of claim 1. Nonetheless, the Examiner summarily dismisses these claimed characteristics by stating that the claimed properties are inherent to Endo because Endo describes a polyester with a phosphorous atom in a side chain.

As explained in the response filed on September 24, 2004, the Examiner's contentions are incorrect. The claimed characteristics provide a fiber that has superior flame resistance, dying properties, abrasion resistance, heat stability, fine whiteness and resistance to hydrolysis than other comparable fibers. Endo fails to disclose or discuss all of these fiber properties or how one can go about optimizing all of these values.

However, in the advisory action dated October 12, 2004, the Examiner still maintains that:

> The take-up speed is a result effective variable and it would be obvious to optimize the take-up speed to improve production time. If the claimed ranges have unexpected results, the burden is upon the Applicant to demonstrate that the claimed ranges are not a matter of simple optimization. The Examiner highly suggests to the Applicant to submit a 37 CFR 1.132 Declaration to establish unexpected results. . . .

To expedite the prosecution of this application, applicants submit herewith the Declaration of Mr. Nakamura. Mr. Nakamura reproduced Example 10 in Endo. Mr. Nakamura also reproduced Examples 1, 2, 5 (now Comparative Example 7) and 7 (now Comparative Example 8).

As shown in Mr. Nakamura's declaration, Example 10 of Endo is the only Example in which the conditions for producing the fiber are provided in detail. In Example 10 of Endo, the take-up speed is outside the range recited in claim 1, and accordingly a high draw ratio is used to provide a fiber with practical strength. The disclosed process produces a high strength fiber, however, the fiber does not satisfy any of formulas 1-3 provided in claim 1. As a result, as shown in Table 1, the abrasion resistance and heat stability of the fiber is poor.

In comparison, Examples 1 and 2 show that when the fiber is produced with the claimed take-up speed, and is made to satisfy formulas 1-3, a fiber that has superior abrasion resistance, heat stability and dyeability, can be obtained. This result is completely unexpected from Endo, since

Endo fails to disclose or suggest the claimed take-up speed. Endo also fails to disclose formulas 1-3, or a fiber that satisfied these conditions. Accordingly, these conditions are not simply an inherent property of all phosphorus compound copolymerized polyester fibers.

Further, Examples 10 and 11 of Endo are only concerned with producing a "flame-retardant polyester fiber containing side chain type phosphorous compound" with practical strength. Endo is completely silent on the improvement of fiber properties, such as superior abrasion resistance, heat stability and dyeability, which can be obtained by a fiber that satisfies formulas 1-3.

As explained in MPEP § 2144.05(II)(B):

> A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) (The claimed wastewater treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The prior art did not recognize that treatment capacity is a function of the tank volume to contractor ratio, and therefore the parameter optimized was not recognized in the art to be a result- effective variable.). *See also In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (prior art suggested proportional balancing to achieve desired results in the formation of an alloy).

Endo fails to recognize the result-effective variables recited in formulas 1-3--accordingly, one of ordinary skill in the art would not be motivated to optimize these variables. This is especially true since Endo is not even concerned with obtaining superior abrasion resistance, heat stability and dyeability, which can be obtained by preparing a fiber that satisfies formulas 1-3 and by using the claimed take-up speed.

Since the claimed take-up speed produces unexpected results and since Endo fails to disclose or suggest a fiber that satisfies formulas 1-3, claim 1 should be allowed. Claims 2-4, 6-8 and 9-11, which depend from claim 1 should be allowed for at least the same reasons.

In the event the U.S. Patent and Trademark office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing **Attorney Docket No. 358362010400**.

Dated: May 31, 2005

Respectfully submitted,

By 54063

Jonathan Bockman
Registration No.: 45,640
MORRISON & FOERSTER LLP
1650 Tysons Blvd, Suite 300
McLean, Virginia 22102
(703) 760-7769